

Exploring Seismic Waves

Name _____ Date _____

Section: _____ Group: _____



The teacher will demonstrate seismic waves using a slinky. The teacher will have three students help as volunteers. One student will be timing the waves on the Slinky (one complete trip, back and forth). The other two students will be hold the slinky at each end.

P-WAVES (PUSH –PULL):

1. The students will start by pulling the Slinky toward themselves a bit and then pushing it away. Draw your observations below:

2. The volunteer students will do 3 trials of the P-wave, timing the wave as it does one complete trip back and forth. Record the information below:

Trial 1:

Trial 2:

Trial 3:

3. Take the average (find the mean) of the 3 trial times.

You should see that the vibrating parts of the Slinky move back and forth along the same direction in which the wave is traveling. This type of wave is called a longitudinal wave or a compression wave, and it is a model for seismic **primary** waves, or **p-waves**. They're known as primary waves because they are the fastest of the earthquake waves, arriving first at distant points.

S-WAVES (SIDE TO SIDE):

1. The volunteer students will shake one end of the Slinky from side to side.
Record your observations below:
2. The volunteer students will do 3 trials of the S-wave, timing the waves as it does one complete trip back and forth. Record the information below:

Trial 1:	Trial 2:	Trial 3:
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3. Take the average (find the mean) of the 3 trial times.

This time you should see a type of wave is called a transverse wave. A transverse wave can move through the bulk of a solid although it cannot move through liquid or gas. The transverse wave you made with the Slinky proves a model for seismic waves called **secondary** waves, or **s-waves** that travel through solid rock. There are really 2 types of S waves. S-H (S-Horizontal) waves (which you just demonstrated) and S-V waves (S-Vertical) which you could demonstrate by moving the Slinky up and then down and watching the wave.

SO WHAT IS GOING ON???

When an earthquake begins the stress on large blocks of rock becomes greater than the strength of the rock. The rock breaks, releasing large amounts of energy. This energy is carried outward in all directions by various seismic waves, some of which can reach the opposite side of the earth in about twenty minutes. The further the waves travel from the focus of the earthquake, the weaker they become.

P-waves push and pull the underground rocks, causing structures on the surface to move back and forth. SH-waves move the rocks beneath the earth's surface from side to side, giving buildings on the surface a good shaking, often with very damaging effects. With SV-waves, the shaking is in a vertical direction-which sometimes can be enough to launch you out of your seat. S-waves and P-waves cause high-frequency vibrations that tend to cause low buildings to vibrate more than tall structures.

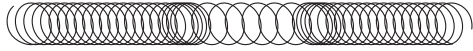
Surface waves are long, slow waves. The low-frequency vibrations that they induce in buildings have more effect on tall buildings than on low ones. Love waves shake things from side to side. The slowest seismic waves, Rayleigh waves, are rolling waves that make you feel as if you're struggling to keep your balance on a ship in the open ocean.

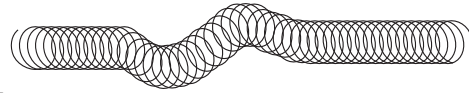
Analyze and Conclude

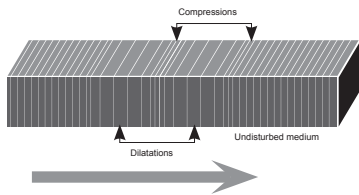
1) What are seismic waves and describe two types.

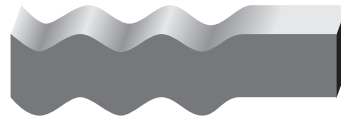
2) Why do we study seismic waves?

4) Identify each diagram as either P-wave or S-wave:









5) In your own words, describe how seismic waves travel through the Earth.